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PacketCable™ Applications

DECT Provisioning Specification

PKT-SP-DECT-PROV-I01-090226

ISSUED

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1 SCOPE

1.1 Introduction and Purpose

PacketCable specifications [DECT-HDV], [DECT-NCS], and [DECT-SIP] define requirements for the PacketCable clients that support High Definition (HD) Voice features. This document specifies the use of the PacketCable Provisioning Framework to configure and manage PacketCable HD Voice capable clients. The PacketCable specifications leverage Digital Enhanced Cordless Telephone (DECT™) technologies to support HD Voice.

1.2 Document Overview

The document is structured as follows:

Section 2 – References

Section 3 – Terms and Definitions

Section 4 – Abbreviations

Section 5 – Informative section describing the HD Voice provisioning requirements

Section 6 – Normative section providing HD Voice provisioning requirements

Annex A – HD Voice Object models and Management Interfaces definitions

Annex B – PacketCable Client Endpoint Object Model

Appendix I – Examples of Telephony Service Delivery Endpoint Associations

1.3 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST"	This word means that the item is an absolute requirement of this specification.
"MUST NOT"	This phrase means that the item is an absolute prohibition of this specification.
"SHOULD"	This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
"SHOULD NOT"	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
"MAY"	This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

2 REFERENCES

2.1 Normative References

In order to claim compliance with this specification, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this specification. Notwithstanding, intellectual property rights may be required to use or implement such normative references.

[EUE-DATA]	PacketCable E-UE Provisioning Data Model Specification, PKT-SP-E-UE-DATA-I02-080710, July 10, 2008, Cable Television Laboratories, Inc.
[RST-EUE-PROV]	PacketCable RST-E-UE Provisioning Specification, PKT-SP-RST-EUE-PROV-I02-080710, July 10, 2008, Cable Television Laboratories, Inc.
[RST-UE-PROV]	PacketCable RST UE Provisioning Specification, PKT-SP-RST-UE-PROV-I01-080905, September 5, 2008, Cable Television Laboratories, Inc.
[UE-DATA]	PacketCable 2.0 UE Provisioning Data Model, PKT-SP-UE-DATA-I01-080905, September 5, 2008, Cable Television Laboratories, Inc.

2.2 Informative References

This specification uses the following informative references:

[ARCH-TR]	PacketCable Architecture Framework Technical Report, PKT-TR-ARCH-FRM-V05-080425, April 25, 2008, Cable Television Laboratories, Inc.
[CANN]	CableLabs Assigned Names and Numbers Specification, CL-SP-CANN-I02-080306, March 6, 2008, Cable television Laboratories, Inc.
[DECT-HDV]	PacketCable High Definition Voice with DECT Specification, PKT-SP-DECT-HDV-I01-090226, February 26, 2009, Cable Television Laboratories, Inc.
[DECT-NCS]	PacketCable DECT NCS Specification, PKT-SP-DECT-NCS-I01-090226, February 26, 2009, Cable Television Laboratories, Inc.
[DECT-SIP]	PacketCable DECT SIP Specification, PKT-SP-DECT-SIP-I01-090226, February 26, 2009, Cable Television Laboratories, Inc.
[E-DVA]	PacketCable Residential SIP Telephony E-DVA Specification, PKT-SP-RST-E-DVA-I04-080710, July 10, 2008, Cable Television Laboratories, Inc.
[EUE-PROV]	PacketCable E-UE Provisioning Framework Specification, PKT-SP-EUE-PROV-I02-080710, July 10, 2008, Cable Television Laboratories, Inc.
[ISO/IEC 19501]	ISO/IEC 19501:2005 Information technology - Open Distributed Processing - Unified Modeling Language (UML) Version 1.4.2.
[MIBS1.5]	PacketCable 1.5, MIBs Framework Specification, PKT-SP-MIBS1.5-I02-070412, April 12, 2007, Cable Television Laboratories, Inc.
[OMA-DM]	Enabler Release Definition for Device Management version 1.2, OMA-ERELED-DM-V1_2-20070209-A, February 9, 2007, Open Mobile Alliance.
[PROV1.5]	PacketCable 1.5, MTA Device Provisioning, PKT-SP-PROV1.5-I03-070412, April 12, 2007, Cable Television Laboratories, Inc.
[RFC 2863]	IETF RFC 2863, The Interfaces Group MIB, June 2000.

- [RFC 2578] IETF RFC 2578/STD0058, Structure of Management Information Version 2 (SMIv2), April 1999.
- [RSTF] PacketCable Residential SIP Telephony Feature Specification, PKT-SP-RSTF-I04-080710, July 10, 2008, Cable Television Laboratories, Inc.
- [UE-PROV] PacketCable 2.0 UE Framework Provisioning, PKT-SP-UE-PROV-I01-080905, September 5, 2008, Cable Television Laboratories, Inc.

2.3 Reference Acquisition

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Internet Engineering Task Force (IETF) Secretariat, 46000 Center Oak Plaza, Sterling, VA 20166, Phone +1-571-434-3500, Fax +1-571-434-3535, <http://www.ietf.org>

Open Mobile Alliance (OMA), OMA Office, 4275 Executive Square, Suite 240, La Jolla, CA 92037, Fax +1-858-623-0743, Internet: <http://www.openmobilealliance.com>

International Telecommunications Union, (ITU), Place des Nations, CH-1211, Geneva 20, Switzerland; Phone +41-22-730-51-11; Fax +41-22-733-7256.

3 TERMS AND DEFINITIONS

This specification uses the following terms:

Client	The terms client and PacketCable client are used interchangeably in this specification.
Configuration	Configuration is the process of defining and propagating data to network elements for providing services.
Data Model	An abstract model that describes representation of data in a system.
DECT	Digital Enhanced Cordless Telephone
Description Framework	A specification for how to describe the management syntax and semantics for a particular device type.
DTMF Event	A DTMF Event is the detection of a DTMF digit.
Endpoint	The term endpoint used in this specification refers to a control signaling endpoint such as an NCS endpoint or a SIP client.
eUE	The logical PacketCable UE component of an E-UE, complies with eSAFE and PacketCable requirements.
E-UE	Embedded User Equipment. A single physical device embedded with an eDOCSIS-compliant DOCSIS Cable Modem and a PacketCable eUE.
FP	The Fixed Part is a portion of the cordless telephone base station defined in ETSI DECT specifications.
Management	Management refers to the protocols, methodologies and interfaces that enable oversight services in a Service Provider Network.
Management Information Base	The description of the data items used by the Network Management for management and configuration of the PacketCable compliant E-UE. Such description is done based on the formal meta-language SMI defined by the corresponding IETF standards.
Management object	A management object (MO) is a subtree of the OMA-DM management tree, which is intended to be a (possibly singleton) collection of nodes that are related in some way. For example, the /DevInfo nodes form a management object. A simple management object may consist of one single node.
Management server	A network-based entity that issues OMA DM commands to devices and correctly interprets responses sent from the devices.
Node	A node is a single element in a management tree. There can be two kinds of nodes in a management tree: interior nodes and leaf nodes. The Format property of a node provides information about whether a node is a leaf or an interior node.
Off-hook Status for the client	Off-hook status at the client is when either the FP is in off-hook status, or the analog line is in off-hook status.
Off-hook Status for the FP	Off-hook status at the FP is when at least one PP is involved in a network call. Note that DECT internal calls do not affect the off-hook status of the FP.
On-hook Status for the client	On hook status at the client is when the FP status is on-hook and the analog line is on-hook or in analog intrusion denial state.

On-hook Status for the FP	On-hook status at the FP is when no PP is involved in a network call. Note that DECT internal calls do not effect the on-hook status of the FP.
PacketCable client	The PacketCable client is a PacketCable network signaling termination within the customer's CPE. Examples include the NCS endpoint within the PacketCable 1.5 E-MTA and the PacketCable 2.0 User Equipment.
Permanent node	A node is permanent if the DDF property Scope is set to Permanent. If a node is not permanent, it is dynamic. A permanent node can never be deleted.
PP	The Portable Part is a portion of the cordless telephone handset defined in ETSI DECT specifications.
Provisioning	Provisioning refers to the processes involved in the initialization of user attributes and resources to provide services to a User. This involves protocols, methodologies, and interfaces to network elements such as: Order Entry and Workflow Systems that carry out business processes, Operational Support Elements that handle network resources, Application Servers that offer services and Use Equipment that offer services.
Request for Comments	Technical policy documents approved by the IETF, which are available on the World Wide Web at http://www.ietf.org

4 ABBREVIATIONS AND ACRONYMS

This specification uses the following abbreviations:

DDF	Device Description Framework
DOCSIS®	Data-Over-Cable Service Interface Specifications
DVA	Digital Voice Adapter
FP	Fix Part
IMS	IP Multimedia Subsystem
MIB	Management Information Base
MO	Managed Objects
OMA	Open Mobile Alliance
OMA-DM	OMA Device Management
POTS	Plain Old Telephony Service
PP	Portable Part
RFC	Request for Comments
RFI	Radio Frequency Interface
RST	Residential SIP Telephony
SIP	Session Initiation Protocol
SNMP	Simple Network Management Protocol
UML	Unified Modeling Language

5 TECHNICAL OVERVIEW

PacketCable is a CableLabs specification effort designed to support the convergence of voice, video, data, and mobility technologies. The PacketCable architecture describes a set of functional groups and logical entities, as well as a set of interfaces that support the information flows exchanged between entities. For more information about PacketCable, please refer to the PacketCable Architecture Framework Technical Report [ARCH-TR].

As part of these efforts, PacketCable specifies applications built upon the PacketCable architecture. One such application is extensions to support HD Voice application. This document describes the configuration and management requirements of the PacketCable HD Voice application for PacketCable 1.5 E-MTAs and PacketCable 2.0 User Equipment (UE). For details on the PacketCable HD Voice application architecture, see [DECT-HDV].

5.1 HD Voice PacketCable Client Provisioning Framework

The PacketCable client provisioning framework supports the management and configuration of embedded devices (e.g., E-MTA and E-DVA) and standalone devices (e.g., S-DVA). Embedded device provisioning requirements are defined in [PROV1.5] and [EUE-PROV]. Both specifications define SNMP protocol [RFC 2578] as the management interface for Embedded PacketCable clients. Standalone device provisioning requirements are defined in [UE-PROV] and are based on OMA-DM specifications [OMA-DM].

For the purpose of this specification, the HD Voice application provisioning requirements are based on PacketCable Provisioning frameworks. In addition, this specification presents an object model that is management interface or protocol independent for future extensibility. See the [UE-DATA] specification for more information on the modeling methodology used in this specification.

5.2 HD Voice Provisioning Requirements Overview

The PacketCable HD Voice application requirements are defined in three different specifications.

[DECT-HDV] specifies the High Definition voice service for PacketCable through the use of a Digital Enhanced Cordless Telephone (DECT) base station integrated with a PacketCable client. The provisioning requirements specified in this document and related to [DECT-HDV] apply to both PacketCable 1.5 and 2.0 devices.

[DECT-NCS] places requirements on PacketCable1.5 clients that interface to the FP for DECT and NCS interoperability. The provisioning requirements for the [DECT-NCS] specifications are applicable to PacketCable 1.5 E-MTAs.

[DECT-SIP] places requirements on the PacketCable 2.0 client that interface to the FP for DECT and SIP interoperability. The provisioning requirements for the [DECT-SIP] specification apply to devices that support the PacketCable Residential SIP Telephony [RSTF] and PacketCable Embedded DVA [E-DVA] specifications.

5.3 HD Voice Provisioning Object Model Components

Figure 1 represents the data model for the data element definitions in this document. Please refer to [UE-DATA] for details on the usage of UML models and subsequent derivation of management elements (e.g., SNMP MIB modules, and OMA DM MOs). The DECT Object Model defines all the HD Voice Provisioning requirements (DECT, DECT-NCS, DECT-SIP) in a protocol agnostic manner. The HD Voice Object Model is then expanded to the PacketCable defined management protocol interface definitions (e.g., SNMP and OMA-DM). The management protocol interface definitions are then supported by PacketCable clients depending on their supported management protocols.

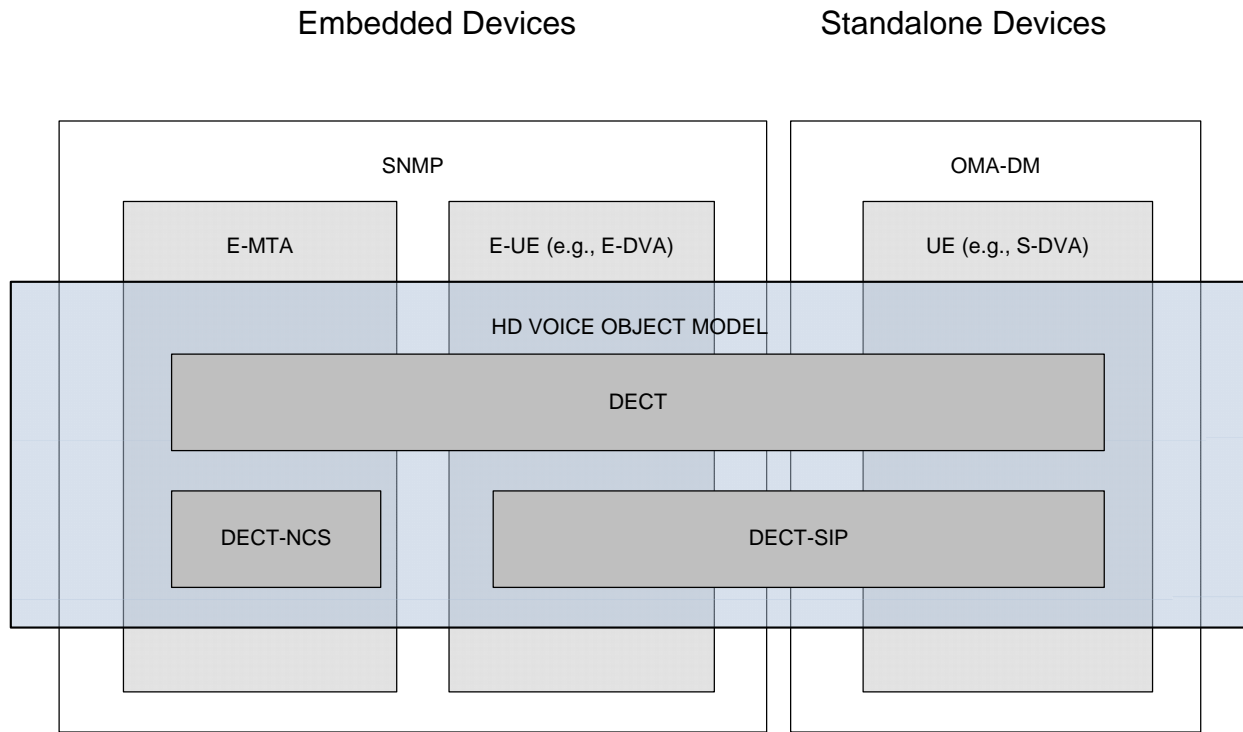


Figure 1 - HD Voice Provisioning Model

5.4 DHCP- and SNMP-based Management Interface Provisioning Protocol

PacketCable specifies a DHCP- and SNMP-based provisioning framework for devices that are embedded with DOCSIS cable modems and are not behind NAT and Firewall devices. SNMP is the management protocol used for PacketCable Embedded Devices. SNMP provisioning offers a backward compatible provisioning framework for current and previous PacketCable specifications. This framework is used for embedded devices that support HD Voice.

5.5 OMA DM Management Interface based Provisioning Protocol

OMA DM provides an interoperable framework for managing device clients. The OMA management end points, termed OMA DM, specify a management interface between the following elements: DM client (e.g., end-user devices) and OMA DM Server (the management application, normally associated with a service provider or a third party organization). PacketCable specifies an OMA DM based provisioning framework used for device client environments that are in conditions where SNMP does not or may not work (e.g., device client can reside behind a NAT or firewall device). See [UE-PROV] for an overview of OMA DM overview and applicability for UEs based provisioning.

6 HD VOICE MANAGEMENT MODEL

6.1 HD Voice PacketCable Service Delivery Model

This specification follows the model of [UE-DATA] to represent the HD Voice Provisioning and Management requirements. The HD Voice Object Model applies to any type of PacketCable clients that support HD Voice. For E-MTAs and E-DVAs, the HD Voice Object Model is mapped into SNMP MIB Modules, and OMA-DM DDF documents for S-DVAs.

6.2 PacketCable Client Endpoint Model

This section specifies modeling considerations to enhance PacketCable client and endpoint architecture in support of HD Voice. In the case of HD Voice, the HD Voice Profiles [DECT-HDV] change the way PacketCable 1.5 and 2.0 devices are provisioned. As an example, consider PacketCable 1.5 E-MTAs. In HD Voice Profile 1 [DECT-HDV], an E-MTA that is HD Voice capable requires support of an analog port and a DECT FP. PPs within the FP and the analog port are seen as a single NCS endpoint. In DECT HD Voice future profiles, both the FP and the analog port can be configured as separate NCS signaling endpoints. See [DECT-HDV] for additional details on use cases pertaining to HD Voice. Further, in subsequent revisions of the HD Voice applications, it is possible to require every single PP within an FP to be considered as a single Phone line (e.g., an NCS endpoint for each PP), or a combination of PPs, and analog ports can also be considered to be part of an endpoint. Therefore, the concept of endpoints needs to be adapted to support such scenarios. This section specifies the architectural model of the aforementioned cases.

The PacketCable client Endpoint architecture has the following objectives:

Address and manage the telephony services delivery from the network side;

Address and manage the telephony services delivery from the telephony side;

Provide the ability to group the telephony services on the telephony side, based on those in the network side, for the purposes of the service features control and management;

Address compatibility with existing PacketCable 1.5 and PacketCable 2.0 data models for E-MTAs and E-UEs. The DECT Data Model needs to preserve the ability to control and manage both NCS and SIP data elements. For example, the notion of the NCS "end-points" ifTable representation should have the adequate data elements. This is true for SIP Data Elements, such as "User Name", "IMPUs", "IMPis", etc.

Other types of the PacketCable clients introduced in the future may need to consider the PacketCable Service Delivery Model defined in this specification.

Figure 2, Figure 3, and Figure 4 show examples of Telephony Service Delivery cases used to introduce the architecture and terminology used in section 6.2.1.

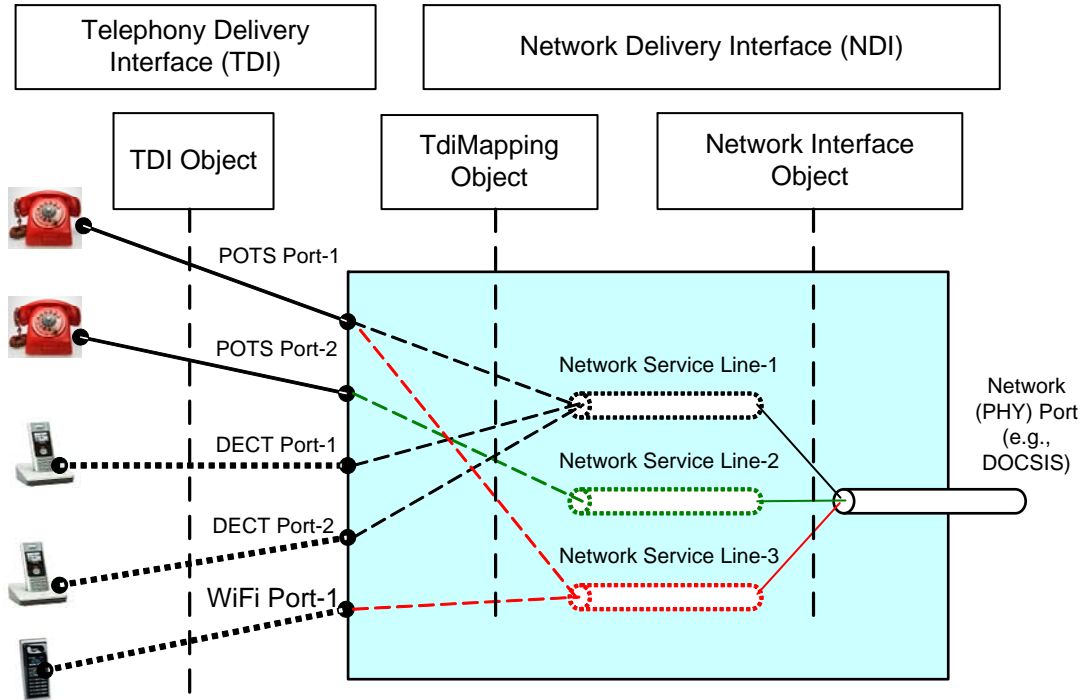


Figure 2 - Conceptual Diagram of the Telephony Service Delivery (general case)

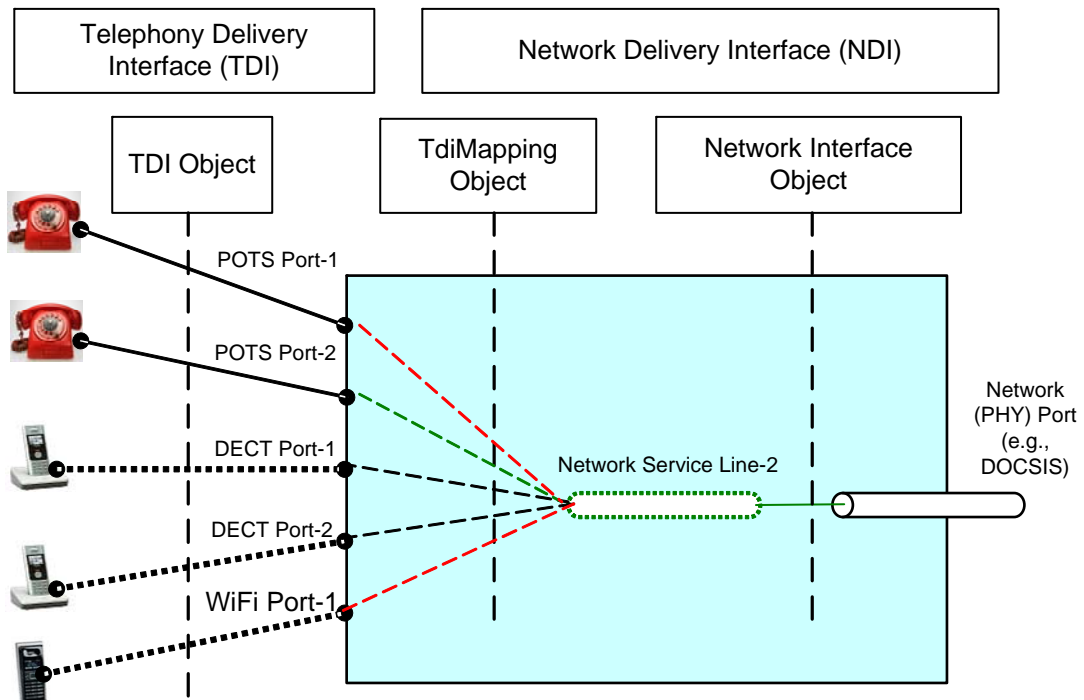


Figure 3 - Conceptual Diagram of the Telephony Service Delivery (HD Voice Profile for [DECT-HDV])

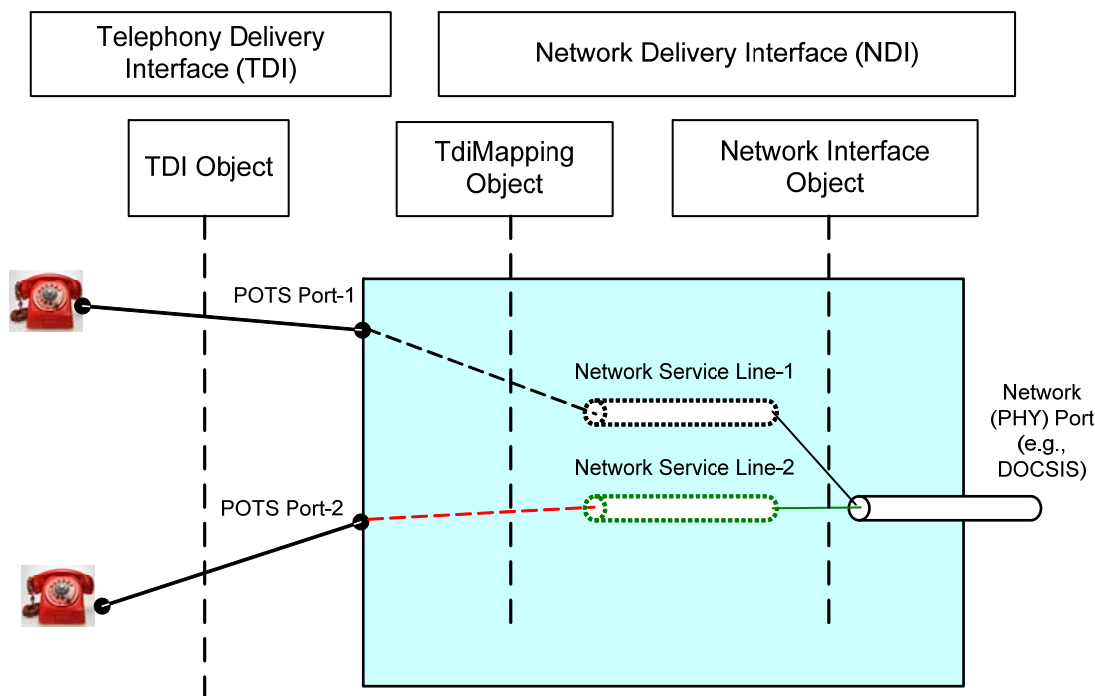


Figure 4 - Conceptual Diagram of the Telephony Service Delivery in PacketCable 1.5 E-MTAs and PacketCable 2.0 E-DVAs

6.2.1 Telephony Service Delivery Layers

In this section, the concept of Telephony Service Delivery is introduced. It addresses components that provide telephony services on Customer Premises Equipment (CPE). Delivery of the Telephony Services in PacketCable Networks has the layered conceptual architecture specified in Figure 2.

In Figure 2, a diverse number of Telephony Delivery Interfaces (TDI) terminate in what are referenced as "telephony ports". TDIs or telephony ports are associated with one or more Network Service Line (NSL). For the NSL-1 depicted in Figure 2, the associated TDIs are terminated with POTS port-1, DECT port-1, and DECT port-2. The NSL-2 is associated to only POTS port-2, and NSL-3 is associated with TDIs terminated on ports POTS port-1 and WiFi port-1. This architecture model only defines the structures to support such combinations. The PacketCable client specifications explicitly specify such requirements (e.g., HD Voice Profiles).

6.2.1.1 Telephony Layer

This layer accepts the acoustic (voice) signal, transforms it to the appropriate electrical signal, and passes it on to the telephony device in the outbound direction, and affects the corresponding operations for the inbound direction. This is called "Telephony Delivery Interface" (TDI). See Figure 2. The terminating points on a TDI are referred to as "ports", or "telephony ports".

Note that "ports" may be of different complexity and different physical nature. For example, it may as simple as a POTS telephone handset providing a mere transformation of the acoustic signal to the electrical one, or vice-versa. Or, it may be as complex as DECT Handsets providing, in addition, the CODEC transformations.

6.2.1.2 Network Layer

This layer provides the necessary operations on passing the electrical signals with the voice data over the IP networks with the corresponding addressing abilities. These operations as a whole are referred to as Network

Delivery Interface (NDI) on Figure 2. Note that networking operations include the functionality of the OSI Network Layers (PHY, DATA, IP).

To provide the ability of the Service Provider to control and manage the service delivery process, the data model needs to provide the means to associate the service delivery with the "telephony ports" on the device. For PacketCable 1.5 E-MTAs and PacketCable 2.0 E-DVAs, such association was implemented by endpoint interfaces using the SNMP Interface table (ifTable from [RFC 2863]). In this case, each POT (telephone port) is represented as an instance in the ifTable and qualified with an interface type (ifType of 'voiceOverCable' [MIBS1.5], [RST-EUE-PROV]). Such strict rules become limiting when the ports of an E-MTA or E-DVA are of different nature (e.g., POTS, DECT handsets).

Though each 'voiceOverCable' type of entry in the ifTable can still represent the logical path of the service delivery to the device from/to the network, it requires a flexible association of Network Delivery Interfaces (Endpoints) with telephony ports (TDI) in order to allow the operator to control and manage the service delivery at the telephony ports level and support requirements such as those discussed for DECT HD Voice Profile 1 and future HD Voice Profiles. Such logical networking path of the service delivery at the network side is referred to as "Network Service Line" (NSL), as seen in Figure 2. Each NSL can be connected with one or more Network PHY Ports (e.g., DOCSIS, Ethernet, etc.).

6.2.2 PacketCable Client

The PacketCable Client performs all necessary operations to interface between the two layers - TDI and NDI (e.g., operations such as networking, signaling, management, etc.). Examples of PacketCable clients include E-MTA, E-DVA, and S-DVA.

Annex C describes the TDI and NDI Object model and the corresponding mappings to different Management protocols supported by PacketCable clients. Figure 3 describes a scenario where all TDI ports are associated with the same Network Service Layer (NSL), i.e., HD Voice Profile from [DECT-HDV]. Finally, Figure 4 shows the case where a single TDI is associated with an NSL as in the PacketCable 1.5 E-MTA and PacketCable 2.0 E-DVA models.

6.3 PacketCable HD Voice Client Capable Device Endpoint Requirements

Each NSL defined for the PacketCable client by configuration and/or particular application is interpreted as an "endpoint" as specified in the corresponding PacketCable Specification.

6.3.1 Endpoint Notation

The notation for endpoints follows a similar format, e.g., [PROV1.5], [RST-EUE-PROV], [RST-UE-PROV]. In those specifications the endpoint '#' (e.g., IEP#<comma-separated list of endpoints>, OEP#<comma-separated list of endpoints> or endpoint interface index in the SNMP Interface table) uniquely identify the endpoint. To support the cases indicated in Section 6.2, Annex C provides mechanisms to define NSLs (endpoints) by listing TDIs. Therefore, a configured endpoint defined by NslTdiMapping.Index is equivalent to the '#' notation of the aforementioned specifications.

6.3.2 Endpoint Configuration

Endpoint identifiers are assigned based on the PacketCable client capabilities listed in Annex A.

For backward compatibility with existing provisioning systems, the following considerations apply to devices that contains a single FP and POTS TDIs.

An E-MTA that is PacketCable HD Voice capable and supports a single FP and a single analog line **MUST** assign the endpoint identifier 9 (for the NslDtiMapping.Index attribute) for the default configuration of the NslDtiMapping object as defined in the Object Operations in C.2.3.2.

An E-DVA that is PacketCable HD Voice capable and supports a single FP and a single analog line **MUST** assign the endpoint identifier 9 (for the NslDtiMapping.Index attribute) for the default configuration of the NslDtiMapping object as defined in the Object Operations in C.2.3.2.

An S-DVA that is PacketCable HD Voice capable and supports a single FP and a single analog line **MUST** assign the endpoint identifier 9 (for the NslDtiMapping.Index attribute) for the default configuration of the NslDtiMapping object as defined in the Object Operations in C.2.3.2.

6.3.3 TDI Notation

The TDIs are listed in the TDI object defined in Annex C.

In general the TDIs use a simple notation <type><#> .

<type> indicates the TDI component class (e.g., POTS, FP) or a composite list of component classes to indicate certain containment model of the TDI. For example FP1/PP indicates a TDI of type PP within the FP1.

<#> indicates the Identifier of the TDI element as advertised in the PacketCable client capabilities of Section A.2.1.

Table 1 shows the notation used for TDIs.

Table 1 - TDI Notation

TDI Type	Notation	Example
Analog Line	POTS#	POTS1 POTS2
DECT FP	FP#	FP1 FP2
DECT PP	FP#/PP#	PPs of FP1 FP1/PP1 FP1/PP2

6.4 DHCP- and SNMP-based Provisioning Requirements for HD Voice

This section specifies requirements to support the HD Voice provisioning requirements for Digital Voice Adapters (DVAs) that support DHCP- and SNMP-based provisioning. PacketCable DVAs that supports the SNMP management interface **MUST** comply with the Object Models and SNMP MIB Modules as specified in Table 2.

Table 2 - HD Voice Data Requirements for SNMP-based Provisioning

Reference	Object Model*	MIB Module	Description
Annex B	DECT	PCKT-DECT-MIB	DECT Features
Annex B	DECT-SIP	PCKT-DECT-SIP-MIB	DECT SIP Signaling interoperability for E-UEs (e.g., E-DVA)
Annex C	TDI	PKTC-TDI-MIB	Telephony Delivery Interface
*There are no requirements for modeling [DECT-NCS].			

6.4.1 HD Voice E-MTA SNMP Requirements

An E-MTA that is PacketCable HD Voice capable MUST support the following:

- The HD Voice Capabilities, as specified in Annex A;
- The HD Voice Object Model, as specified in Annex B;
- The PKTC-DECT-MIB Module, as specified in Annex B;
- HD Voice PacketCable Service Delivery Model defined in Annex C;
- The PKTC-TDI-MIB Module, as specified in Annex C;
- The management requirements defined in [PROV1.5].

6.4.2 HD Voice E-DVA SNMP Requirements

An E-DVA that supports PacketCable HD Voice MUST support the following:

- The HD Voice Capabilities, as specified in Annex A;
- The HD Voice Object Model, as specified in Annex B;
- The PKTC-DECT-MIB Module, as specified in Annex B;
- The PKTC-DECT-SIP-MIB Module defined in Annex B;
- HD Voice PacketCable Service Delivery Model defined in Annex C;
- The PKTC-TDI-MIB Module, as specified in Annex C;
- The management requirements defined in [RST-EUE-PROV] and [EUE-DATA].

6.5 OMA-DM Provisioning Requirements for HD Voice

This section specifies requirements to support the HD Voice provisioning requirements for PacketCable DVAs that support the OMA DM based management interface. PacketCable DVAs that support the OMA DM management interface comply with the Object Models and OMA DM DDFs defined in Table 3.

Table 3 - OMA DM HD Voice Provisioning Data Requirements

Reference	Object* Model	MO DDF URN	DDF Path	Description
Annex B	DECT	urn:cablelabs:pktc2:oma:dm:dect	./Pktc2	DECT Features
Annex B	DECT-SIP	urn:cablelabs:pktc2:oma:dm:dect-sip	./Pktc2	DECT SIP Signaling interoperability for UEs (e.g., S-DVA)
Annex C	TDI	urn:cablelabs:pktc2:oma:dm:tdi	./Pktc2	Telephony Delivery Interface
*[DECT-NCS] is not applicable to devices that support OMA-DM Provisioning requirements (e.g., S-DVAs).				

6.5.1 HD Voice OMA-DM Requirements

An S-DVA that supports PacketCable HD Voice MUST support the following requirements:

The HD Voice Capabilities, as specified in Annex A;

The HD Voice Object Model, as specified in Annex B;

The DECT DDF, as specified in Annex B;

The DECT-SIP DDF, as specified in Annex B;

HD Voice PacketCable Service Delivery Model defined in Annex C;

The TDI-DDF Module, as specified in Annex C;

The management requirements defined in [RST-UE-PROV] and [UE-DATA].

Annex A HD Voice PacketCable Client Capabilities

This Annex contains HD Voice related capabilities for the PacketCable client.

DHCP- and SNMP-based Provisioning PacketCable clients represent the HD Voice capabilities as defined in [PROV1.5] and [EUE-PROV].

OMA-DM-based Provisioning PacketCable clients represent the HD Voice capabilities as defined in [UE-PROV].

A.1 Number of DECT FPs supported

This TLV indicates the number of DECT FPs supported by the PacketCable client device

Type	Length	Values	Comment	Default value
5.36	1	n	Number of FPs	N/A

A.2 FP Capabilities

This TLV indicates the FP capabilities.

Type	Length	Values	Comment	Default value
5.37	n	composite	Number of PPs per FPs	N/A

A.2.1 FP Identifier

This TLV indicates the FP identifier (#) to name the FP. The TDI Name of the FP e.g., 'FP1', is defined in Section 6.3.3.

Type	Length	Values	Comment	Default value
5.37.1	1	1..255	FP Identifier	N/A

A.2.2 Number of PPs

This TLV indicates the number of PPs supported by the DECT FPs of the PacketCable client device.

Type	Length	Values	Comment	Default value
5.37.2	2	1..65535	Number of PPs	N/A

Annex B HD Voice Management Requirements

B.1 DECT Object Model Overview

This section specifies the management model for the HD Voice Application. Unless specified, PacketCable clients will not persist operator configuration data using the data models herein described. This data model is defined after the PacketCable Clients E-MTA, E-DVA, and S-DVA and may be applicable to other types of PacketCable devices.

B.2 DECT Object Model Definitions

B.2.1 DECT Object Model Data Types

This section defines the data types used in the DECT object model.

Table 4 - Data Type Definitions

Data Type Name	Base Type	Permitted Values
PkctSpecVersion	unsignedByte	0..255

PkctSpecVersion

This data type represents the publication spec number of the corresponding requirement being referenced.

PacketCable specifications have the notation PKT-SP-*<SPECNAME>*I*<##>*-YYMMDD.

This PacketCable Specification Version value corresponds to the integer representation of *<##>*.

B.2.2 DECT Object Model Class Diagram

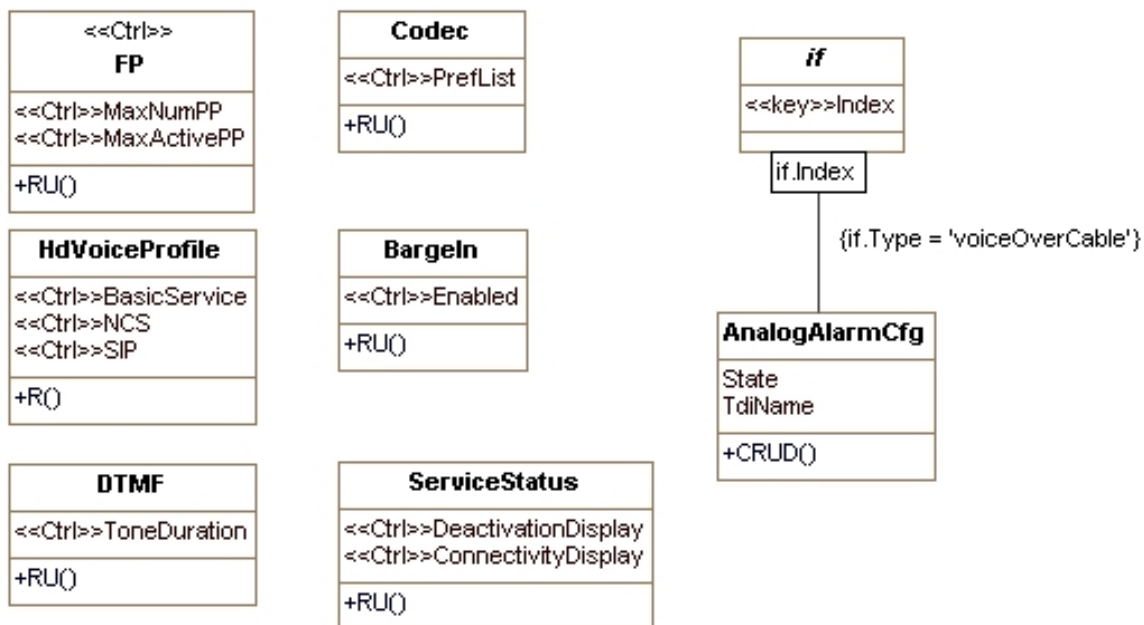


Figure 5 - DECT Object Model Diagram

B.2.3 DECT Object Model Description

B.2.3.1 FP Object

This object represents configuration parameters associated with the FP.

Object Operations: None

Reference: [DECT-HDV]

Table 5 - FP Object

Attribute Name	Type	Access	Type Constraints	Units	Default
MaxNumPP	unsignedInt	R		PPs	
MaxActivePP	UnsignedInt	RU		PPs	

MaxNumPP

This attribute represents the maximum number of PPs supported by the FP.

Reference: [DECT-HDV]

MaxActivePP

This attribute represents the maximum number of PPs that can reach the state Idle_Unlocked simultaneously. The FP ages out PPs as soon as the PP leaves the Idle_Unlocked state to either Active_unlocked or unknown, allowing another PP to attempt synchronization with the FP. By default, this attribute reports the MaxNumPP attribute value.

Reference: [DECT-HDV]

B.2.3.2 HDVoiceProfile Object

This object indicates the DH Voice profile capabilities of the FP.

Object Operations: None

Reference: [DECT-HDV]

Table 6 - HDVoiceProfile Object

Attribute Name	Type	Access	Type Constraints	Units	Default
BasicService	PktcSpecVersion	R			
NCS	PktcSpecVersion	R			
SIP	PktcSpecVersion	R			

BasicService

This attribute represents the supported HD Voice profile for basic service.

Reference: [DECT-HDV]

NCS

This attribute represents the supported HD voice profile for NCS.

Reference: [DECT-NCS]

SIP

This attribute represents the supported HD Voice profile for SIP.

Reference: [DECT-SIP]

B.2.3.3 Codec Object

This object represents the configuration of Codec related parameters for FPs.

Object Operations: None

Reference: [DECT-HDV]

Table 7 - Codec Object

Attribute Name	Type	Access	Type Constraints	Units	Default
PrefList	AdminString	RU			"G722,PCMU,PCMA"

PrefList

This attribute represents the codec selection in prefer order from left to right. The codec list is comma separated with no additional characters between code names. When a user associated with an endpoint linked to this FP has configured its own preferred codec list, this attribute is ignored.

Reference: [DECT-HDV]

B.2.3.4 DTMF Object

This object represents the configuration of DTMF related parameters for FPs.

Object Operations: None

Reference: [DECT-HDV]

Table 8 - DTMF Object

Attribute Name	Type	Access	Type Constraints	Units	Default
ToneDuration	unsignedInt	RU		milliseconds	100

ToneDuration

This attribute specifies the tone duration for DTMF defined length events sent by a PP to the FP.

Reference: [DECT-HDV]

B.2.3.5 Bargeln Object

This object represent the configuration parameters of the Barge-In feature of DECT capable PacketCable Clients.

Object Operations: None

Reference: [DECT-HDV]

Table 9 - Bargeln Object

Attribute Name	Type	Access	Type Constraints	Units	Default
Enabled	boolean	RU			true

Enabled

This attribute indicates the barge-in state of this instance. The value 'true' indicates barge-in is enabled. The value 'false' indicates barge-in is disabled.

Reference: [DECT-HDV]

B.2.3.6 ServiceStatus Object

This object represents configuration parameters to display service status to PP associated with the FP.

Object Operations: None

Reference: [DECT-HDV]

Table 10 - Service Status Object

Attribute Name	Type	Access	Type Constraints	Units	Default
DeactivationDisplay	AdminString	RU			"Service Deactivated"
ConnectivityDisplay	AdminString	RU			"Network Unavailable"

DeactivationDisplay

This attribute indicates the configured text to display in the PP when the PacketCable Client service is disconnected.

Reference: [DECT-HDV]

ConnectivityDisplay

This attribute indicates the configured text to display in the PP when the PacketCable Client has no Network (Service) Connectivity.

Reference: [DECT-HDV]

B.2.3.7 AnalogAlarmCfg Object

This object represents the configuration of an end point to support the Analog Alarm Configuration.

Object Operations

Reference: [DECT-HDV]

When an endpoint instance is configured to enable the analog Alarm Configuration, the largest POTS TDI identifier (PkTcTdiType = 'pots') in the endpoint takes the role of analog alarm port. Therefore, an endpoint is allowed to have only one POTS configured as an analog Alarm port.

End points not instantiated in this object have no analog Alarm configured (i.e., equivalent to analogAlarmCfg.State = 'none').

Table 11 - AnalogAlarmCfg Object

Attribute Name	Type	Access	Type Constraints	Units	Default
ifIndex	InterfaceIndex	key	ifType = voiceOverCable		
State	Enum	CRUD	none(1) preemptive(2) simultaneousCalls(3)		'none'
TdiName	UnsignedInt	R			

IfIndex

This key represents the interface Index associated with the endpoint the analog alarm is configured.

State

This attribute represents the Interface index of the TDI mapped into the interface. The Interfaces allowed to be configured in this object are of the type 'voiceOverCable' The aggregate of TDIs associated with this interface constitute an endpoint. Below are the possible options:

'none' indicates the end point has no analog alarm configuration

'preemptive' indicates the analog alarm is configured in a preemptive mode of operation.

'SimultaneousCalls' indicates the PacketCable client can have a regular phone call and an alarm call simultaneously. This type of analog alarm configuration is not applicable to PacketCable clients that support NCS signaling (i.e. E-MTAs) and a set to this attribute with this value is rejected.

TdiName

This attribute represents the name of the POTS port configured for analog alarm.

B.2.4 DECT-SIP Object Model Class Diagram



Figure 6 - DECT-SIP Object Model Diagram

B.2.5 DECT-SIP Object Model Description

B.2.5.1 CFVDis Object

This object represents FP configuration parameters for User Identities with the CFV feature activated.

Object Operations: None

Reference: [DECT-HDV]

Table 12 - CFVFDIs Object

Attribute Name	Type	Access	Type Constraints	Units	Default
NewFwdCalls	AdminString	RU			""
ActStat	AdminString	RU			""

NewFwdCalls

This attribute represents the text to be displayed by the PacketCable Client PPs when new calls are forwarded based on the CFV feature.

Reference: [DECT-SIP]

ActStat

This attribute represents the text to be displayed by the PacketCable Client PPs going off-hook when the CFV feature is active.

Reference: [DECT-HDV]

B.2.5.2 SCFDIs Object

This object represents FP configuration parameters for User Identities with the SCF feature activated.

Object Operations: None

Reference: [DECT-HDV]

Table 13 - SCFDIs Object

Attribute Name	Type	Access	Type Constraints	Units	Default
NewFwdCalls	AdminString	RU			""

NewFwdCalls - This attribute represents the text to be displayed by the PacketCable Client PPs when new calls are forwarded based on the CFV feature.

Reference: [DECT-HDV]

B.2.5.3 DNDDIs Object

This object represents FP configuration parameters for User Identities with the DND feature activated.

Object Operations: None

Reference: [DECT-HDV]

Table 14 - DNDIs Object

Attribute Name	Type	Access	Type Constraints	Units	Default
ActStat	AdminString	RU			""

ActStat - This attribute represents the text to be displayed by the PacketCable Client PPs going off-hook when the DND feature is active.

Reference: [DECT-HDV]

B.3 DECT SNMP MIB MODULES

B.3.1 DECT SNMP MIB MODULE

```

PKTC-DECT-MIB DEFINITIONS ::= BEGIN
IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32
        FROM SNMPv2-SMI
    OBJECT-GROUP,
    MODULE-COMPLIANCE
        FROM SNMPv2-CONF
    SnmpAdminString
        FROM SNMP-FRAMEWORK-MIB
    TEXTUAL-CONVENTION,
    TruthValue
        FROM SNMPv2-TC
    pktcApplicationMibs
        FROM CLAB-DEF-MIB;

pktcDectMib MODULE-IDENTITY
    LAST-UPDATED "200902260000Z" -- February 26, 2009
    ORGANIZATION "Cable Television Laboratories, Inc."
    CONTACT-INFO
        "Broadband Network Services
        Cable Television Laboratories, Inc.
        858 Coal Creek Circle,
        Louisville, CO 80027, USA
        Phone: +1 303-661-9100
        Email: mibs@cablelabs.com

        Acknowledgements:
        Thomas Clack, Broadcom
        Eugene Nechamkin, Broadcom
        Josh Littlefield, Cisco
        Jerry Mahler, Motorola
        Eduardo Cardona, CableLabs"
    DESCRIPTION
        "This MIB module contains the PacketCable client
        HD Voice management requirements."
    REVISION "200902260000Z" -- February 26, 2009
    DESCRIPTION
        "Initial version, published as part of the CableLabs
        DECT Provisioning Specification PKT-SP-DECT-PROV-I01-090226
        Copyright 2009 Cable Television Laboratories, Inc.
        All rights reserved."
    ::= { pktcApplicationMibs 4 }

-- Textual Conventions

PktcSpecVersion ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
        "This data type represents the publication spec number of
        the corresponding requirement being referenced.
        PacketCable specifications have the notation
        PKT-SP-<SPECNAME>I<##>-YYMMDD.
        This value corresponds to the integer representation
        of <##>."
    REFERENCE
        "PacketCable DECT Specification"
    SYNTAX Unsigned32

```

```

-- Object Definitions
pktcDectNotifications OBJECT IDENTIFIER ::= { pktcDectMib 0 }
pktcDectObjects       OBJECT IDENTIFIER ::= { pktcDectMib 1 }
pktcDectFP            OBJECT IDENTIFIER ::= { pktcDectObjects 1 }

pktcDectFPMaxNumPP OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "PPs"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This attribute represents the maximum number of PPs
        supported by the FP."
    REFERENCE
        "PacketCable DECT Specification"
    ::= { pktcDectFP 1 }

pktcDectFPMaxActivePP OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "PPs"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute represents the maximum number of PPs that
        can reach the state Idle_Unlocked simultaneously. The FP
        ages out PPs as soon as the PP leaves the Idle_Unlocked
        state to either Active_unlocked or unknown, allowing
        another PP to attempt synchronization with the FP.
        By Default this attribute reports the MaxNumPP
        attribute value."
    REFERENCE
        "ETSI EN 300 175-3, Digital Enhanced Cordless
        Telecommunications (DECT);Common Interface (CI); Part 3:
        Medium Access Control (MAC) layer"
    ::= { pktcDectFP 2 }

pktcDectHDVoiceProfile OBJECT IDENTIFIER ::= { pktcDectObjects 2 }

pktcDectHDVoiceProfileBasicService OBJECT-TYPE
    SYNTAX      PktcSpecVersion
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This attribute represents the supported HD Voice
        profile for basic service."
    REFERENCE
        "PacketCable DECT Specification"
    ::= { pktcDectHDVoiceProfile 1 }

pktcDectHDVoiceProfileNCS OBJECT-TYPE
    SYNTAX      PktcSpecVersion
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This attribute represents the supported HD voice
        profile for NCS."
    REFERENCE
        "PacketCable DECT-HDV Specification"
    ::= { pktcDectHDVoiceProfile 2 }

pktcDectHDVoiceProfilesIP OBJECT-TYPE
    SYNTAX      PktcSpecVersion
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This attribute represents the supported HD Voice
        profile for SIP."

```

```

REFERENCE
    "PacketCable DECT-HDV Specification"
 ::= { pktcDectHDVoiceProfile 3 }

pktcDectCodec OBJECT IDENTIFIER ::= { pktcDectObjects 3 }

pktcDectCodecPrefList OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute represents the codec selection in prefer
        order from left to right. The codec list is comma separated
        with no additional characters between code names.
        When a user associated with an endpoint linked to this
        FP has configured its own preferred codec list this
        attribute is ignored."
    REFERENCE
        "PacketCable DECT-HDV Specification"
    DEFVAL      { "G722,PCMU,PCMA" }
    ::= { pktcDectCodec 1 }

pktcDectDTMF OBJECT IDENTIFIER ::= { pktcDectObjects 4 }

pktcDectDTMFToneDuration OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "milliseconds"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute specifies the tone duration for DTMF
        defined length events sent by a PP to the FP."
    REFERENCE
        "PacketCable DECT-HDV Specification"
    DEFVAL      { 100 }
    ::= { pktcDectDTMF 1 }

pktcDectBargeIn OBJECT IDENTIFIER ::= { pktcDectObjects 5 }

pktcDectBargeInEnabled OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute indicates the barge-in state of this
        instance. The value 'true' indicates barge-in is enabled.
        The value 'false' indicates barge-in is disabled."
    REFERENCE
        "PacketCable DECT-HDV Specification"
    DEFVAL      { true }
    ::= { pktcDectBargeIn 1 }

pktcDectServiceStatus OBJECT IDENTIFIER ::= { pktcDectObjects 6 }

pktcDectServiceStatusDeactivationDisplay OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute indicates the configured text to display
        in the PP when the PacketCable Client service is
        disconnected."
    REFERENCE
        "PacketCable DECT-HDV Specification"
    DEFVAL      { "Service Deactivated" }
    ::= { pktcDectServiceStatus 1 }

```

```

pktcDectServiceStatusConnectivityDisplay OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute indicates the configured text to display
        in the PP when the PacketCable Client has no Network
        (Service) Connectivity."
    REFERENCE
        "PacketCable DECT-HDV Specification"
    DEFVAL      { "Network Unavailable" }
    ::= { pktcDectServiceStatus 2 }

pktcDectAnalogAlarmCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcDectAnalogAlarmCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object represents the configuration of an end point
        to support the Analog Alarm Configuration."
    REFERENCE
        "PacketCable DECT specification."
    ::= { pktcDectObjects 7 }

pktcDectAnalogAlarmCfgEntry OBJECT-TYPE
    SYNTAX      PktcDectAnalogAlarmCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of pktcDectAnalogAlarmCfgTable."
    INDEX {
        ifIndex
    }
    ::= { pktcDectAnalogAlarmCfgTable 1 }

pktcDectAnalogAlarmCfgEntry ::= SEQUENCE {
    pktcDectAnalogAlarmCfgState
        INTEGER,
    pktcDectAnalogAlarmCfgTdiName
        SnmpAdminString
}

pktcDectAnalogAlarmCfgState OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute represents the Interface index of the TDI
        mapped into the interface. The Interfaces allowed to be
        configured in this object are of the type 'voiceOverCable'
        The aggregate of TDIs associated with this interface
        constitute an endpoint.

        Below are the possible options:

        'none' indicates the end point has no analog alarm
        Configuration

        'preemptive' indicates the analog alarm is configured
        in a preemptive mode of operation.

        'SimultaneousCalls' indicates the PacketCable client can
        have a regular phone call and an alarm call simultaneously.

        This type of analog alarm configuration is not applicable
        to PacketCable clients that support NCS signaling

```

```

        (i.e. E-MTAs) and a set to this attribute with this value
        is rejected."
 ::= {pktcDectAnalogAlarmCfgEntry 1 }

pktcDectAnalogAlarmCfgTdiName OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute represents the name of the POTS port
        configured for analog alarm."
 ::= {pktcDectAnalogAlarmCfgEntry 2 }

-- Conformance Definitions
pktcDectMibConformance OBJECT IDENTIFIER ::= { pktcDectMib 2 }
pktcDectMibCompliances OBJECT IDENTIFIER ::= { pktcDectMibConformance 1 }
pktcDectMibGroups      OBJECT IDENTIFIER ::= { pktcDectMibConformance 2 }

pktcDectCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for the HD Voice PacketCable
        Client device."
    MODULE -- this MODULE
    MANDATORY-GROUPS {
        pktcDectGroup
    }
 ::= { pktcDectMibCompliances 1 }

    pktcDectGroup OBJECT-GROUP
    OBJECTS {
        pktcDectFPMaxNumPP,
        pktcDectFPMaxActivePP,
        pktcDectHDVoiceProfileBasicService,
        pktcDectHDVoiceProfileNCS,
        pktcDectHDVoiceProfileSIP,
        pktcDectCodecPrefList,
        pktcDectDTMFToneDuration,
        pktcDectBargeInEnabled,
        pktcDectServiceStatusDeactivationDisplay,
        pktcDectServiceStatusConnectivityDisplay
    }
    STATUS      current
    DESCRIPTION
        "Group of objects implemented in the HD Voice PacketCable
        Client device."
 ::= { pktcDectMibGroups 1 }
END

```

B.3.2 DECT-NCS SNMP MIB MODULE

There are no SNMP MIB Modules specified for [DECT-NCS].

B.3.3 DECT-SIP SNMP MIB MODULE

```

PKTC-DECT-SIP-MIB DEFINITIONS ::= BEGIN
IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE
        FROM SNMPv2-SMI
    OBJECT-GROUP,
    MODULE-COMPLIANCE
        FROM SNMPv2-CONF
    SnmpAdminString
        FROM SNMP-FRAMEWORK-MIB
    pktcApplicationMibs
        FROM CLAB-DEF-MIB;

```

```

pktcDectSipMib MODULE-IDENTITY
    LAST-UPDATED "200902260000Z" -- February 26, 2009
    ORGANIZATION "Cable Television Laboratories, Inc."
    CONTACT-INFO
        "Broadband Network Services
        Cable Television Laboratories, Inc.
        858 Coal Creek Circle,
        Louisville, CO 80027, USA
        Phone: +1 303-661-9100
        Email: mibs@cablelabs.com

        Acknowledgements:
        Thomas Clack, Broadcom
        Eugene Nechamkin, Broadcom
        Josh Littlefield, Cisco
        Jerry Mahler, Motorola
        Eduardo Cardona, CableLabs"
    DESCRIPTION
        "This MIB module contains the PacketCable client
        HD Voice SIP integration management requirements."
    REVISION "200902260000Z" -- February 26, 2009
    DESCRIPTION
        "Initial version, published as part of the CableLabs
        DECT Provisioning Specification PKT-SP-DECT-PROV-I01-090226
        Copyright 2008 Cable Television Laboratories, Inc.
        All rights reserved."
    ::= { pktcApplicationMibs 5 }

-- Textual Conventions

-- Object Definitions
pktcDectSipNotifications OBJECT IDENTIFIER ::= { pktcDectSipMib 0 }
pktcDectSipObjects       OBJECT IDENTIFIER ::= { pktcDectSipMib 1 }
pktcDectSipCFVDis        OBJECT IDENTIFIER ::= { pktcDectSipObjects 1 }

pktcDectSipCFVDisNewFwdCalls OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute represents the text to be displayed by the
        PacketCable Client PPs when new calls are forwarded based
        on the CFV feature."
    REFERENCE
        "PacketCable DECT-SIP Specification"
    DEFVAL      { "" }
    ::= { pktcDectSipCFVDis 1 }

pktcDectSipCFVDisActStat OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This attribute represents the text to be displayed by the
        PacketCable Client PPs going off-hook when the CFV feature
        is active."
    REFERENCE
        "PacketCable DECT-SIP Specification"
    DEFVAL      { "" }
    ::= { pktcDectSipCFVDis 2 }

pktcDectSipSCFDis OBJECT IDENTIFIER ::= { pktcDectSipObjects 2 }

pktcDectSipSCFDisNewFwdCalls OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-write

```

```

STATUS      current
DESCRIPTION
    "This attribute represents the text to be displayed by the
    PacketCable Client PPs when new calls are forwarded based
    on the CFV feature."
REFERENCE
    "PacketCable DECT-SIP Specification"
DEFVAL      { "" }
::= { pktcDectSipSCFDis 1 }

pktcDectSipDNDDis OBJECT IDENTIFIER ::= { pktcDectSipObjects 3 }

pktcDectSipDNDDisActStat OBJECT-TYPE
SYNTAX      SnmpAdminString
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "This attribute represents the text to be displayed by the
    PacketCable Client PPs going off-hook when the DND feature
    is active."
REFERENCE
    "PacketCable DECT-SIP Specification"
DEFVAL      { "" }
::= { pktcDectSipDNDDis 1 }

-- Conformance Definitions
pktcDectSipMibConformance OBJECT IDENTIFIER ::= { pktcDectSipMib 2 }
pktcDectSipMibCompliances OBJECT IDENTIFIER ::= { pktcDectSipMibConformance 1 }
pktcDectSipMibGroups      OBJECT IDENTIFIER ::= { pktcDectSipMibConformance 2 }

pktcDectSipCompliance MODULE-COMPLIANCE
STATUS      current
DESCRIPTION
    "The compliance statement for the SIP requirements of
    the HD Voice PacketCable client device."
MODULE -- this MODULE
MANDATORY-GROUPS {
    pktcDectSipGroup
}
::= { pktcDectSipMibCompliances 1 }

pktcDectSipGroup OBJECT-GROUP
OBJECTS {
    pktcDectSipCFVDisNewFwdCalls,
    pktcDectSipCFVDisActStat,
    pktcDectSipSCFDisNewFwdCalls,
    pktcDectSipDNDDisActStat
}
STATUS      current
DESCRIPTION
    "Group of objects for SIP DECT extensions."
::= { pktcDectSipMibGroups 1 }
END

```

B.4 DECT OMA Management Objects (MO)

B.4.1 DECT High Level MO

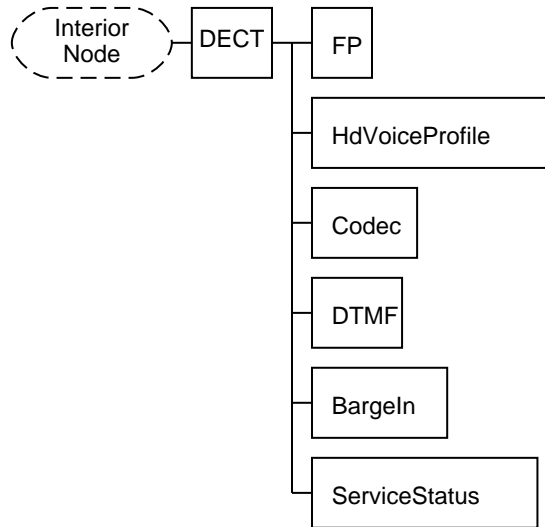


Figure 7 - DECT High Level OMA Management

B.4.2 DECT Nodes

B.4.2.1 DECT FP Node MO tree

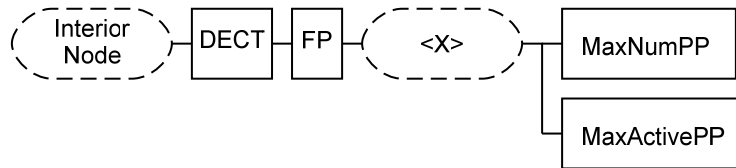


Figure 8 - Node FP of DECT OMA Management

B.4.2.2 DECT FP MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT/FP	current	One	Node	Get
./DECT/FP<X>	current	OneOrMore	Node	Get
./DECT/MaxNumPP/<X>/MaxNumPP	current	OneOrZero	int	Get
./DECT/MaxActivePP/<X>/MaxActivePP	current	OneOrZero	int	Get, Replace

B.4.2.3 DECT HdVoiceProfile Node MO tree

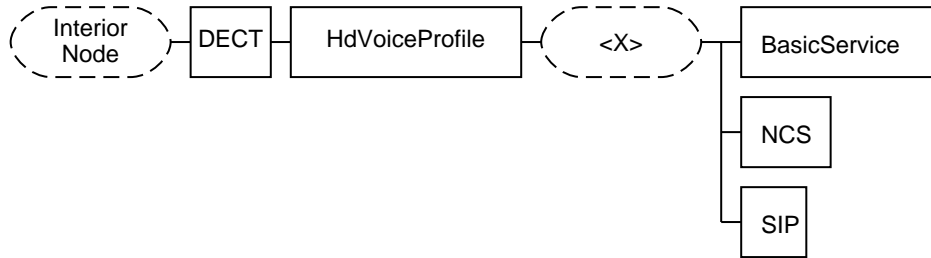


Figure 9 - Node HDVoiceProfile of DECT OMA Management

B.4.2.4 DECT HdVoiceProfile MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT/HDVoiceProfile	current	One	Node	Get
./DECT/HDVoiceProfile<X>	current	OneOrMore	Node	Get
./DECT/BasicService/<X>/BasicService	current	OneOrZero	chr	Get
./DECT/NCS/<X>/NCS	current	OneOrZero	chr	Get
./DECT/SIP/<X>/SIP	current	OneOrZero	chr	Get

B.4.2.5 DECT Codec Node MO tree

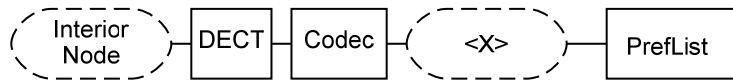


Figure 10 - Node Codec of DECT OMA Management

B.4.2.6 DECT Codec MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT/Codec	current	One	Node	Get
./DECT/Codec<X>	current	OneOrMore	Node	Get
./DECT/PrefList/<X>/PrefList	current	OneOrZero	chr	Get, Replace

B.4.2.7 DECT DTMF Node MO tree

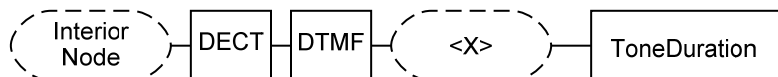


Figure 11 - Node DTMF of DECT OMA Management

B.4.2.8 DECT DTMF MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT/DTMF	current	One	Node	Get
./DECT/DTMF<X>	current	OneOrMore	Node	Get
./DECT/ToneDuration/<X>/ToneDuration	current	OneOrZero	int	Get, Replace

B.4.2.9 DECT Bargeln Node MO tree



Figure 12 - Node Bargeln of DECT OMA Management

B.4.2.10 DECT Bargeln MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT/Bargeln	current	One	Node	Get
./DECT/Bargeln<X>	current	OneOrMore	Node	Get
./DECT/Enabled/<X>/Enabled	current	OneOrZero	int	Get, Replace

B.4.2.11 DECT ServiceStatus Node MO tree

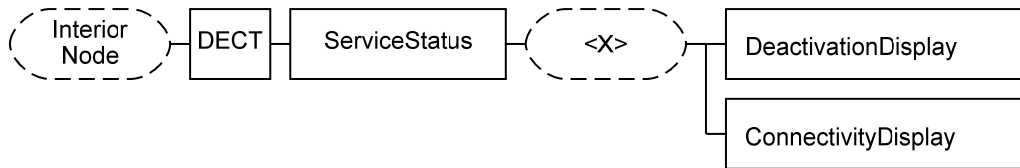


Figure 13 - Node ServiceStatus of DECT OMA Management

B.4.2.12 DECT ServiceStatus MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT/ServiceStatus	current	One	Node	Get
./DECT/ServiceStatus<X>	current	OneOrMore	Node	Get
./DECT/DeactivationDisplay/<X>/DeactivationDisplay	current	OneOrZero	Chr	Get, Replace
./DECT/ConnectivityDisplay/<X>/ConnectivityDisplay	current	OneOrZero	Chr	Get, Replace

B.4.2.13 DECT AnalogAlarmCfg tree



Figure 14 - Node ServiceStatus of DECT OMA Management

B.4.2.14 DECT AnalogAlarmCfg MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT/AnalogAlarmCfg	current	One	Node	Get
./DECT/AnalogAlarmCfg/<X>	current	OneOrMore	Node	Add, Get, Replace
./DECT/AnalogAlarmCfg/<X>/State	current	OneOrZero	int	Add, Get, Replace
./DECT/AnalogAlarmCfg/<X>/TdiName	current	OneOrZero	chr	Add, Get, Replace

B.4.3 DECT OMA Device Description Framework (DDF)

```

<?xml version="1.0"?>
<MgmtTree xmlns:uml="http://schema.omg.org/spec/UML/2.1.2"
xmlns:xmi="http://schema.omg.org/spec/XMI/2.1"
xmlns:CL_Custom="http://www.magicdraw.com/schemas/CL_Custom.xmi"
xmlns="http://www.w3.org/1999/xhtml">
  <VerDTD>1.2</VerDTD>
  <Man>PacketCable - Cable Laboratories Inc.</Man>
  <!--This DDF considers as model the UE MO (as defined in the PacketCable
specifications) followed by a colon character (e.g., DECT:) -->
  <Mod>DECT:</Mod>
  <Node>
    <NodeName>DECT</NodeName>
    <Path>./Pktc2</Path>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DefaultValue/>
      <Description>The node that defines the DECT MO
tree.</Description>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The interior node holding all nodes of the PacketCable
DECT MO three</DFTitle>
      <DFType>
        <DDFName>urn:cablelabs:pktc2:oma:dm:dect</DDFName>
      </DFType>
      <CaseSense>
        <CIS/>
      </CaseSense>
    </DFProperties>
    <Node>
      <NodeName>FP</NodeName>
      <DFProperties>
        <AccessType>
          <Get/>
        </AccessType>
        <DFFormat>
          <node/>
        </DFFormat>
        <Occurrence>
          <One/>
        </Occurrence>
        <DFTitle>DECT.FP</DFTitle>
        <DFType>
          <DDFName/>
        </DFType>
      </DFProperties>
    </Node>
    <Node>
      <NodeName/>
      <DFProperties>
        <AccessType></AccessType>
        <DFFormat>
          <node/>
        </DFFormat>
        <Occurrence>
          <OneOrMore/>
        </Occurrence>
        <DFTitle/>
      </DFProperties>
    </Node>
  </Node>

```

```

        <DFType>
            <DDFName/>
        </DFType>
    </DFProperties>
</Node>
<Node>
    <NodeName>MaxNumPP</NodeName>
    <DFProperties>
        <AccessType>
            <Get/>
        </AccessType>
        <DefaultValue></DefaultValue>
        <Description/>
        <DFFormat><int/></DFFormat>
        <Occurrence>
            <One/>
        </Occurrence>
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            <Permanent/>
        </Scope>
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            <MIME>text/plain</MIME>
        </DFType>
        <CaseSense/>
    </DFProperties>
    <Value/>
</Node>
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    <DFProperties>
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        <DefaultValue></DefaultValue>
        <Description/>
        <DFFormat><int/></DFFormat>
        <Occurrence>
            <One/>
        </Occurrence>
        <Scope>
            <Permanent/>
        </Scope>
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        <DFType>
            <MIME>text/plain</MIME>
        </DFType>
        <CaseSense/>
    </DFProperties>
    <Value/>
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</Node>
</Node>
<Node>
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    <DFProperties>
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            <Get/>
        </AccessType>
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            <node/>
        </DFFormat>
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            <One/>
        </Occurrence>
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        <DFType>
            <DDFName/>
        </DFType>
    </DFProperties>

```

```

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  <DFProperties>
    <AccessType></AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <OneOrMore/>
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      <DDFName/>
    </DFType>
  </DFProperties>
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    <DFProperties>
      <AccessType></AccessType>
      <DefaultValue></DefaultValue>
      <Description/>
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      </Occurrence>
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        <Permanent/>
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      <Description/>
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```

```

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        </DFFormat>
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            <DDFName/>
        </DFType>
    </DFProperties>
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        <DFProperties>
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            <DFType>
                <DDFName/>
            </DFType>
        </DFProperties>
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    <DFProperties>
        <AccessType></AccessType>
        <DefaultValue>G722 PCMU PCMA</DefaultValue>
        <Description/>
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            <One/>
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        <Scope>
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        <DFTitle/>
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        </DFType>
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    </DFProperties>
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```

```

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    </AccessType>
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      <One/>
    </Occurrence>
  </DFProperties>

```

```

        </Occurrence>
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```

```

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            <node/>
        </DFFormat>
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    </DFProperties>

```

```

        <DFTitle>DECT.AnalogAlarmCfg</DFTitle>
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        </DFType>
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            <DefaultValue></DefaultValue>
            <Description/>
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            </DFFormat>
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                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle/>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
            <CaseSense/>
        </DFProperties>
        <Value/>
    </Node>

```

```

        </Node>
      </Node>
    </Node>
  </MgmtTree>

```

B.5 DECT-SIP OMA Management Objects (MO)

B.5.1 DECT-SIP High Level MO

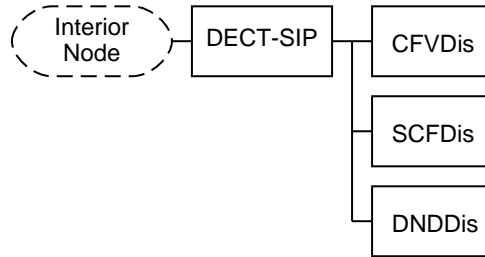


Figure 15 - DECT-SIP High Level OMA Management

B.5.2 DECT-SIP Nodes

B.5.2.1 DECT-SIP CFVDis Node MO tree

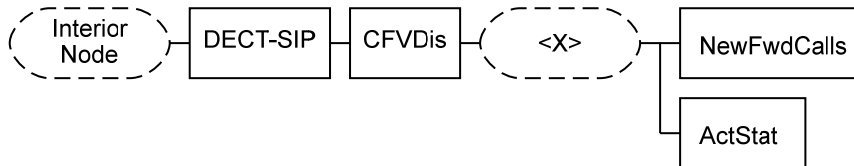


Figure 16 - Node CFVDis of DECT OMA Management

B.5.2.2 DECT-SIP CFVDis MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT-SIP/CFVDis	current	One	Node	Get
./DECT-SIP/CFVDis<X>	current	OneOrMore	Node	Get, Replace
./DECT-SIP/NewFwdCalls/<X>/NewFwdCalls	current	OneOrZero	chr	Get, Replace
./DECT-SIP/ActStat/<X>/ActStat	current	OneOrZero	Chr	Get, Replace

B.5.2.3 DECT-SIP SCFDis Node MO tree



Figure 17 - Node CSFDis of DECT OMA Management

B.5.2.4 DECT-SIP SCFDis MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT-SIP/SCFDis	current	One	Node	Get
./DECT-SIP/SCFDis<X>	current	OneOrMore	Node	Get, Replace
./DECT-SIP/NewFwdCalls/<X>/NewFwdCalls	current	OneOrZero	chr	Get, Replace

B.5.2.5 DECT-SIP DNDDis Node MO tree



Figure 18 - Node DNDDis of DECT OMA Management

B.5.2.6 DECT-SIP DNDDis MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./DECT-SIP/DNDDis	current	One	Node	Get
./DECT-SIP/DNDDis<X>	current	OneOrMore	Node	Get, Replace
./DECT-SIP/ActStat/<X>/ActStat	current	OneOrZero	chr	Get, Replace

B.5.3 DECT-SIP OMA Device Description Framework (DDF)

```

<?xml version="1.0"?>
<MgmtTree xmlns:uml="http://schema.omg.org/spec/UML/2.1.2"
xmlns:xmi="http://schema.omg.org/spec/XMI/2.1"
xmlns:CL_Custom="http://www.magicdraw.com/schemas/CL_Custom.xmi"
xmlns="http://www.w3.org/1999/xhtml">
  <VerDTD>1.2</VerDTD>
  <Man>PacketCable - Cable Laboratories Inc.</Man>
  <!--This DDF considers as model the UE MO (as defined in the PacketCable
specifications) followed by a colon character (e.g., DECT-SIP:) -->
  <Mod>DECT-SIP:</Mod>
  <Node>
    <NodeName>DECT-SIP</NodeName>
    <Path>./Pktc2</Path>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DefaultValue/>
      <Description>The node that defines the DECT-SIP MO
tree.</Description>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The interior node holding all nodes of the PacketCable
DECT-SIP MO three</DFTitle>
      <DFType>
        <DDFName>urn:cablelabs:pktc2:oma:dm:dect-sip</DDFName>
      </DFType>
      <CaseSense>
        <CIS/>
      </CaseSense>
    </DFProperties>
  </Node>
</MgmtTree>
    
```

```

</DFProperties>
<Node>
  <NodeName>CFVDis</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <DFTitle>DECT-SIP.CFVDis</DFTitle>
    <DFType>
      <DDFName/>
    </DFType>
  </DFProperties>
  <Node>
    <NodeName/>
    <DFProperties>
      <AccessType></AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <DFTitle/>
      <DFType>
        <DDFName/>
      </DFType>
    </DFProperties>
  <Node>
    <NodeName>NewFwdCalls</NodeName>
    <DFProperties>
      <AccessType></AccessType>
      <DefaultValue>" "</DefaultValue>
      <Description/>
      <DFFormat><chr/></DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle/>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
      <CaseSense/>
    </DFProperties>
    <Value/>
  </Node>
  <Node>
    <NodeName>ActStat</NodeName>
    <DFProperties>
      <AccessType></AccessType>
      <DefaultValue>" "</DefaultValue>
      <Description/>
      <DFFormat><chr/></DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <Scope>
        <Permanent/>
      </Scope>
    </DFProperties>
  </Node>

```

```

                                <DFTitle/>
                                <DFType>
                                    <MIME>text/plain</MIME>
                                </DFType>
                                <CaseSense/>
                            </DFProperties>
                            <Value/>
                        </Node>
                    </Node>
                </Node>
            <Node>
                <NodeName>SCFDis</NodeName>
                <DFProperties>
                    <AccessType>
                        <Get/>
                    </AccessType>
                    <DFFormat>
                        <node/>
                    </DFFormat>
                    <Occurrence>
                        <One/>
                    </Occurrence>
                    <DFTitle>DECT-SIP.SCFDis</DFTitle>
                    <DFType>
                        <DDFName/>
                    </DFType>
                </DFProperties>
                <Node>
                    <NodeName/>
                    <DFProperties>
                        <AccessType></AccessType>
                        <DFFormat>
                            <node/>
                        </DFFormat>
                        <Occurrence>
                            <OneOrMore/>
                        </Occurrence>
                        <DFTitle/>
                        <DFType>
                            <DDFName/>
                        </DFType>
                    </DFProperties>
                </Node>
                <Node>
                    <NodeName>NewFwdCalls</NodeName>
                    <DFProperties>
                        <AccessType></AccessType>
                        <DefaultValue>" "</DefaultValue>
                        <Description/>
                        <DFFormat><chr/></DFFormat>
                        <Occurrence>
                            <One/>
                        </Occurrence>
                        <Scope>
                            <Permanent/>
                        </Scope>
                        <DFTitle/>
                        <DFType>
                            <MIME>text/plain</MIME>
                        </DFType>
                        <CaseSense/>
                    </DFProperties>
                    <Value/>
                </Node>
            </Node>
        </Node>
    </Node>
</Node>
<Node>
    <NodeName>DNDDis</NodeName>

```

```

    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <DFTitle>DECT-SIP.DNDDis</DFTitle>
      <DFType>
        <DDFName/>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <NodeName/>
    <DFProperties>
      <AccessType></AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <DFTitle/>
      <DFType>
        <DDFName/>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <NodeName>ActStat</NodeName>
    <DFProperties>
      <AccessType></AccessType>
      <DefaultValue>" "</DefaultValue>
      <Description/>
      <DFFormat><chr/></DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle/>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
      <CaseSense/>
    </DFProperties>
    <Value/>
  </Node>
</Node>
</Node>
</Node>
</MgmtTree>

```

Annex C PacketCable Client Endpoint Object Model

C.1 TDI Object Model Overview

This section defines the management model for the Telephony Delivery Interface (TDI) as described in Section 6.1. Unless specified, the PacketCable clients will not persist operator configuration data using the data models herein described. Other documents that reference this object model might change the persistent requirement of the device. This data model is defined after the PacketCable Clients E-MTA, E-DVA, and S-DVA and may be applicable to other types of PacketCable devices.

C.2 TDI Object Model Definitions

C.2.1 TDI Object Model Data Types

This section defines the data types used in the TDI object model.

Table 15 - Data Type Definitions

Data Type Name	Base Type	Permitted Values
PkctTdiType	Enum	pots(1) dectFP(2) dectPP(2)

C.2.1.1 *PkctTdiType*

This data type represents the TDI types.

The term 'pots' refers to Plan Old Telephony Service analog phone lines.

The term 'dectFP' refers to DECT FP air interface. The DECT FPtype ('dectFP') is used to refer to the entire set of DECT port (PPs) of an FP.

The term 'dectPP' refers to DECT PP air interface.

C.2.2 TDI Object Model Class Diagram

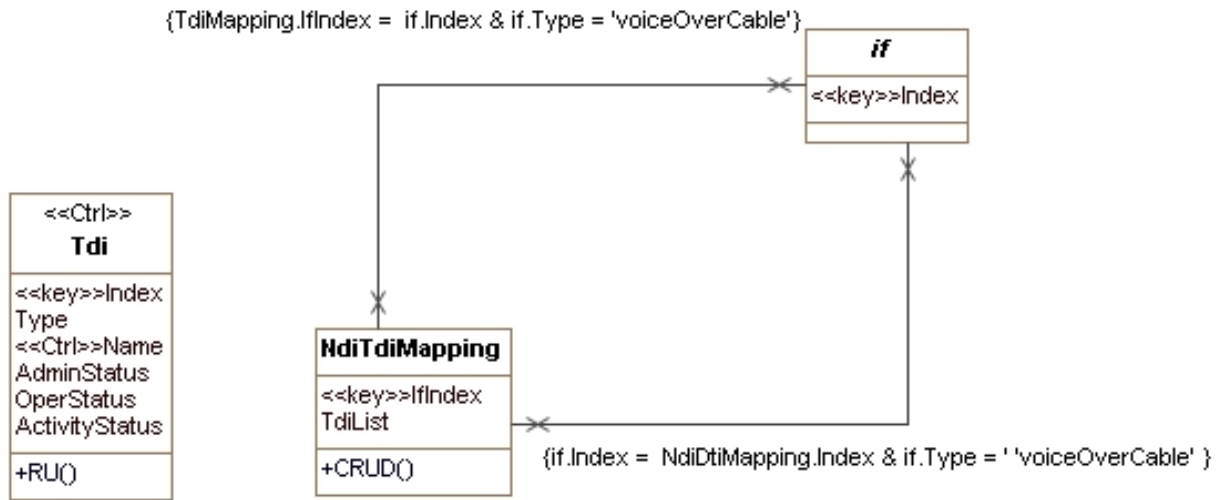


Figure 19 - TDI Object Model Diagram

C.2.3 TDI Object Model Description

C.2.3.1 Tdi Object

This object represents the list of Telephony Delivery Interfaces (TDI) of the device.

Object Operations: None

Table 16 - Tdi Object

Attribute Name	Type	Access	Type Constraints	Units	Default
Index	unsignedInt	key	1.. 4294967295		
Type	PktcTdiType	R			
Name	AdminString	R			
AdminStatus	Enum	RU	up(1) down(2) testing(3)		
OperStatus	Enum	R	up(1) down(2) testing(3) unknown(4) dormant(5) notPresent(6)		
ActivityStatus	Enum	R	inActive(1) active (2)		

Index

This key represents the unique identifier of the TDI associated with a particular telephony port (e.g., RJ-11 port, DECT port corresponding to the registered DECT handset).

Type

This attribute represents the interface Type of the TDI port.

Name

This attribute represents the name of the TDI. The textual string should be defined for the PacketCable specifications and should correspond to the 'Tdi.Type' data element value. Examples of TDI names are 'POTS1', 'FP1', FP1/PP1, FP1/PP2.

Reference: Section 6.3.3.

AdminStatus

This attribute indicates the desired state of the interface as requested by the Management Operations (for the enumeration types - refer to the description of 'ifAdminStatus' MIB Object in [RFC 2863]).

OperStatus

This attribute Indicates the current operational state of the TDI (for the enumeration types - refer to the description of 'ifOperStatus' in [RFC 2863]).

ActivityStatus

This attribute indicates the Telephony Activities potentially going on for the particular TDI:

'notActive': none of the Telephony activities (services) going on the port. If the value of the 'OperStatus' is not 'up', then 'ActivityStatus' must remain in this state.

'active': one or more Telephony services are active on port. The examples of the Telephony services are: tones generated on the port in response to SIP requests, loopback tests, etc. The particular definition of all Telephony activities should be specified in the corresponding document for the particular PacketCable client.

ActivityStatus can be in this state if and only if the value of the 'OperStatus' is 'up'.

C.2.3.2 NdiTdiMapping Object

This object represents the NDI definitions of the device. This object allows the aggregation of TDIs as part of a NDI.

Object Operations

A PacketCable HD Voice capable device that supports a single FP and a single analog line MUST by default create a 'R' (read-only) aggregating both the DECT (FP) and the POTS TDIs into the single endpoint of the device.

A PacketCable HD Voice capable device and supports a single FP and a single analog line MAY support the configuration of the DECT (FP) and the POTS TDIs as separate endpoints. If so, the E-MTA MUST remove the default configuration defined above upon a TDI to NDI mapping configured instance. In addition, the PacketCable HD Voice capable device MUST create instances in the Interface object (e.g., SMI ifTable) for both the FP and the POTS TDIs.

Table 17 - NdiTdiMapping Object

Attribute Name	Type	Access	Type Constraints	Units	Default
IfIndex	InterfaceIndex	key	9..4294967295		
TdiList	AdminString	CRUD			

IfIndex

This key represents the unique NDI identifier of instances in this object. Upon an instance creation in this object a new Interface object (e.g., ifTable) instance is created for the newly created NDI (endpoint) with interface Index the same as this attribute.

TdiList

This attribute represents the identifiers of the TDIs associated to this NDI object instance. This list is a comma separated of the TDI Names. For example, 'POTS2,FP1,FP2/PP3'.

C.3 TDI SNMP MIB MODULES**C.3.1 TDI SNMP MIB MODULE**

```

PKTC-TDI-MIB DEFINITIONS ::= BEGIN
IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32
        FROM SNMPv2-SMI
    OBJECT-GROUP,
    MODULE-COMPLIANCE
        FROM SNMPv2-CONF
    SnmpAdminString
        FROM SNMP-FRAMEWORK-MIB

TEXTUAL-CONVENTION
    InterfaceIndex
        FROM SNMPv2-TC
    pktcApplicationMibs
        FROM IF-MIB
    FROM CLAB-DEF-MIB;

pktcTdiMib MODULE-IDENTITY
LAST-UPDATED "200902260000Z" -- February 26, 2009
ORGANIZATION "Cable Television Laboratories, Inc."
CONTACT-INFO
    "Broadband Network Services
    Cable Television Laboratories, Inc.
    858 Coal Creek Circle,
    Louisville, CO 80027, USA
    Phone: +1 303-661-9100
    Email: mibs@cablelabs.com

    Acknowledgements:
    Thomas Clack, Broadcom
    Eugene Nechamkin, Broadcom
    Josh Littlefield, Cisco
    Jerry Mahler, Motorola
    Eduardo Cardona, CableLabs."
DESCRIPTION
    "This MIB module contains the PacketCable client
    Telephony Delivery Interface (TDI) and Network
    Delivery Interface relationships."
REVISION "200902260000Z" -- February 26, 2009

```

```

DESCRIPTION
    "Initial version, published as part of the CableLabs
    DECT Provisioning Specification
    PKT-SP-DECT-PROV-I01-090226
    Copyright 2009 Cable Television Laboratories, Inc.
    All rights reserved."
 ::= { pktcApplicationMibs 6 }

-- Textual Conventions

PktcTdiType ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This data type represents the TDI types.
        'pots' refers to Plan Old Telephony Service analog phone lines.
        'dectFP' refers to DECT FP air interface.
        'dectPP' refers to DECT PP air interface."
    REFERENCE
        "PacketCable DECT-HDV Specification"
    SYNTAX      INTEGER
                {
                    pots(1),
                    dectFP(2),
                    dectPP(3)
                }

-- Object Definitions
pktcTdiNotifications OBJECT IDENTIFIER ::= { pktcTdiMib 0 }
pktcTdiObjects OBJECT IDENTIFIER ::= { pktcTdiMib 1 }

pktcTdiTdiTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcTdiTdiEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object represents the Telephony Delivery Interface (TDI)
        object."
    REFERENCE
        "PacketCable DECT Provisioning Specification"
    ::= {pktcTdiObjects 1 }

pktcTdiTdiEntry OBJECT-TYPE
    SYNTAX      PktcTdiTdiEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Conceptual row of pktcTdiTdiTable."
    INDEX {
        pktcTdiTdiIndex
    }
    ::= {pktcTdiTdiTable 1 }

PktcTdiTdiEntry ::= SEQUENCE {
    pktcTdiTdiIndex
        Unsigned32,
    pktcTdiTdiType
        PktcTdiType,
    pktcTdiTdiName
        SnmpAdminString,
    pktcTdiTdiAdminStatus
        INTEGER,
    pktcTdiTdiOperStatus
        INTEGER,
    pktcTdiTdiActivityStatus
        INTEGER
    }

```

```

pktcTdiTdiIndex      OBJECT-TYPE
    SYNTAX             Unsigned32
    MAX-ACCESS         not-accessible
    STATUS              current
    DESCRIPTION
        "This key represents the unique identifier of the TDI
        associated with a particular telephony port
        (e.g., RJ-11 port, DECT port corresponding to the registered
        DECT handset)."
```

::= {pktcTdiTdiEntry 1 }

```

pktcTdiTdiType       OBJECT-TYPE
    SYNTAX             PkctcTdiType
    MAX-ACCESS         read-only
    STATUS              current
    DESCRIPTION
        "This attribute represents the interface Type of the TDI port."
```

::= {pktcTdiTdiEntry 2 }

```

pktcTdiTdiName       OBJECT-TYPE
    SYNTAX             SnmpAdminString
    MAX-ACCESS         read-only
    STATUS              current
    DESCRIPTION
        "This attribute represents the name of the TDI. The textual
        string should be defined for the PacketCable specifications
        and should correspond to the 'Tdi.Type' data element value.
        Examples of TDI names are 'POTS1', 'FP1', FP1/PP1, FP1/PP2."
```

::= {pktcTdiTdiEntry 3 }

```

pktcTdiTdiAdminStatus OBJECT-TYPE
    SYNTAX             INTEGER
                        {
                            up(1),
                            down(2),
                            testing(3)
                        }
    MAX-ACCESS         read-write
    STATUS              current
    DESCRIPTION
        "This attribute indicates the desired state of the interface
        as requested by the Management Operations (for the enumeration
        types - refer to the description of 'ifAdminStatus' in
        RFC 2863)."
```

::= {pktcTdiTdiEntry 4 }

```

pktcTdiTdiOperStatus OBJECT-TYPE
    SYNTAX             INTEGER
                        {
                            up(1),
                            down(2),
                            testing(3),
                            unknown(4),
                            dormant(5),
                            notPresent(6)
                        }
    MAX-ACCESS         read-only
    STATUS              current
    DESCRIPTION
        "This attribute Indicates the current operational state of the
        TDI (for the enumeration types - refer to the description of
        'ifOperStatus' in RFC 2863)."
```

::= {pktcTdiTdiEntry 5 }

```

pktcTdiTdiActivityStatus OBJECT-TYPE
    SYNTAX             INTEGER
```

```

        {
            active(1),
            inactive(2)
        }

MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "This attribute indicates the Telephony Activities potentially
    going on for the particular TDI:

    'notActive'
    None of the Telephony activities (services) going on the port.
    If the value of the 'OperStatus' is not 'up' then
    'ActivityStatus' must remain in this state.

    'active'
    One or more Telephony services are active on port.
    The examples of the Telephony services are: tones generated
    on the port in response to SIP requests, loopback tests, etc.
    The particular definition of all Telephony activities should
    be specified in the corresponding document for the particular
    PacketCable client. ActivityStatus can be in this state if
    and only if the value of the 'OperStatus' is 'up'."
 ::= {pktcTdiTdiEntry 6 }

pktcTdiNdiTdiMappingTable OBJECT-TYPE
SYNTAX SEQUENCE OF PkctcTdiNdiTdiMappingEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "This object represents the NDI definitions of the device.
    This object allows the aggregation of TDIs as part of a NDI."
REFERENCE
    "PacketCable DECT Provisioning Specification"
 ::= {pktcTdiObjects 2 }

pktcTdiNdiTdiMappingEntry OBJECT-TYPE
SYNTAX PkctcTdiNdiTdiMappingEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "The Conceptual row of pkctcTdiNdiTdiMappingTable."
INDEX {
    pkctcTdiNdiTdiMappingIfIndex
}
 ::= {pktcTdiNdiTdiMappingTable 1 }

PkctcTdiNdiTdiMappingEntry ::= SEQUENCE {
    pkctcTdiNdiTdiMappingIfIndex
        InterfaceIndex,
    pkctcTdiNdiTdiMappingTdiList
        Unsigned32
}

pkctcTdiNdiTdiMappingIfIndex OBJECT-TYPE
SYNTAX InterfaceIndex
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "This key represents the unique NDI identifier of instances
    in this object. Upon an instance creation in this object a new
    Interface object (e.g., ifTable) instance is created for the
    newly created NDI (endpoint) with interface Index the same
    as this attribute."
 ::= {pktcTdiNdiTdiMappingEntry 1 }

```

```

pkcTdiNdiTdiMappingTdiList    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute represents the identifiers of the TDIs
        associated to this NDI object instance. This list is a comma
        separated of the TDI Names. For example 'POTS2,FP1,FP2/PP3'."
    ::= { pkcTdiNdiTdiMappingEntry 2 }

-- Conformance Definitions
    pkcTdiMibConformance OBJECT IDENTIFIER ::= { pkcTdiMib 2 }
pkcTdiMibCompliances OBJECT IDENTIFIER ::= { pkcTdiMibConformance 1 }
pkcTdiMibGroups      OBJECT IDENTIFIER ::= { pkcTdiMibConformance 2 }

pkcTdiCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for the TDI requirements of
        the PacketCable client device."
    MODULE -- this MODULE
    MANDATORY-GROUPS {
        pkcTdiGroup
    }
    ::= { pkcTdiMibCompliances 1 }

    pkcTdiGroup OBJECT-GROUP
OBJECTS {
    pkcTdiTdiType,
    pkcTdiTdiName,
    pkcTdiTdiAdminStatus,
    pkcTdiTdiOperStatus,
    pkcTdiTdiActivityStatus,
    pkcTdiNdiTdiMappingTdiList
}
    STATUS      current
    DESCRIPTION
        "Group of objects for Telephony Delivery
        Interfaces (TDI)."
```

```

END
```

C.4 TDI OMA Management Objects (MO)

C.4.1 TDI High Level MO

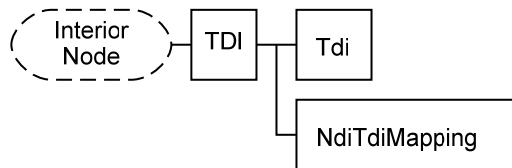


Figure 20 - TDI High Level OMA Management

C.4.2 TDI Nodes

C.4.2.1 TDI Tdi Node MO tree

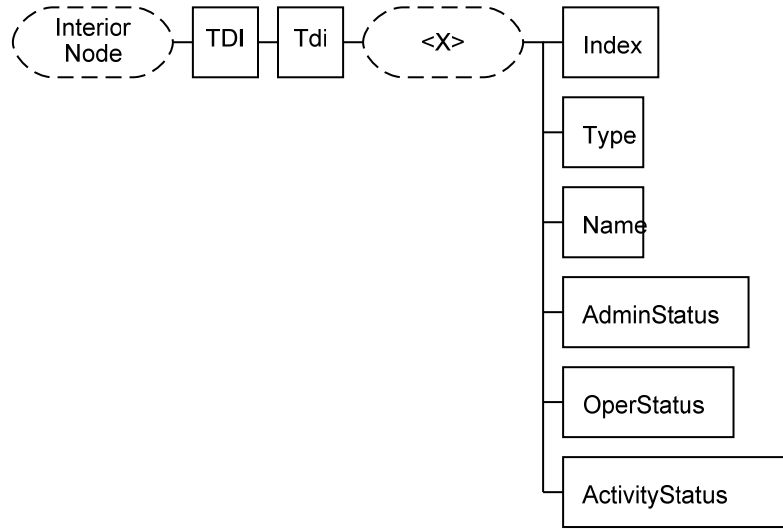


Figure 21 - Node Tdi of TDI OMA Management

C.4.2.2 TDI Tdi MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./TDI/Tdi	current	One	Node	Get
./TDI/Tdi<X>	current	OneOrMore	Node	Get
./TDI/Index/<X>/Index	current	OneOrZero	int	Get
./TDI/Type/<X>/Type	current	OneOrZero	int	Get
./TDI/Name/<X>/Name	current	OneOrZero	chr	Get
./TDI/AdminStatus/<X>/AdminStatus	current	OneOrZero	int	Get, Replace
./TDI/OperStatus/<X>/OperStatus	current	OneOrZero	int	Get
./TDI/ActivityStatus/<X>/ActivityStatus	current	OneOrZero	int	Get

C.4.2.3 TDI NdiTdiMapping Node MO tree

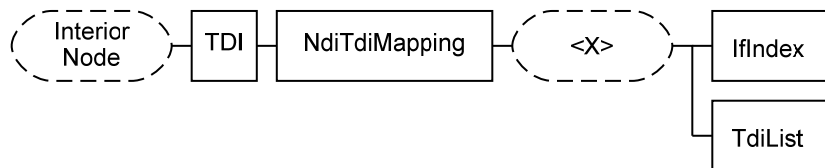


Figure 22 - Node NdiTdiMapping of TDI OMA Management

C.4.2.4 TDI NdiTdiMapping MO Node Description

MO Element	Status	Occurrence	Format	Access Type
./TDI/NdiTdiMapping	current	One	Node	Get
./TDI/NdiTdiMapping<X>	current	OneOrMore	Node	Add, Delete, Get, Replace
./TDI/IfIndex/<X>/IfIndex	current	OneOrZero	int	Add, Get, Replace, Delete
./TDI/TdiList/<X>/TdiList	current	OneOrZero	chr	Add, Get, Replace, Delete

C.5 TDI OMA Device Description Framework (DDF)

```
<?xml version="1.0"?>
<MgmtTree xmlns:uml="http://schema.omg.org/spec/UML/2.1.2"
xmlns:xmi="http://schema.omg.org/spec/XMI/2.1"
xmlns:CL_Custom="http://www.magicdraw.com/schemas/CL_Custom.xmi"
xmlns="http://www.w3.org/1999/xhtml" >
  <VerDTD>1.2</VerDTD>
  <Man>PacketCable - Cable Laboratories Inc.</Man>
  <!--This DDF considers as model the UE MO (as defined in the PacketCable
specifications) followed by a colon character (e.g., TDI:) -->
  <Mod>TDI:</Mod>
  <Node>
    <NodeName>TDI</NodeName>
    <Path>./Pktc2</Path>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DefaultValue/>
      <Description>The node that defines the TDI MO tree.</Description>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The interior node holding all nodes of the PacketCable
TDI MO three</DFTitle>
      <DFType>
        <DDFName>urn:cablelabs:pktc2:oma:dm:tdi</DDFName>
      </DFType>
      <CaseSense>
        <CIS/>
      </CaseSense>
    </DFProperties>
    <Node>
      <NodeName>Tdi</NodeName>
      <DFProperties>
        <AccessType>
          <Get/>
        </AccessType>
        <DFFormat>
          <node/>
        </DFFormat>
        <Occurrence>
          <One/>
        </Occurrence>
        <DFTitle>TDI.Tdi</DFTitle>
        <DFType>
          <DDFName/>
        </DFType>
      </DFProperties>
```

```

<Node>
  <NodeName/>
  <DFProperties>
    <AccessType></AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <OneOrMore/>
    </Occurrence>
    <DFTitle/>
    <DFType>
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Appendix I Examples of Telephony Service Delivery Endpoint Associations

The following are examples of the mapping of the telephony addressable elements to the TDI and service "telephony ports".

PacketCable 1.5 E-MTAs

In PacketCable 1.5, the name of the NCS end-point ("endpoint name") is assigned to the physical MTA port. By transitivity, it is also assigned to each entry of ifTable; such that the endpoint name "aaln/1" corresponds to the first port on the E-MTA and "aaln/2" – to the second one as seen in Table 18.

Table 18 – Endpoint Representation in IfTable

ifIndex	ifType	ifDescription	ifAdminStatus
1	198	"Voice Over Cable Interface"	'up'
2	198	"Voice Over Cable Interface"	'up'

For such cases, the Tdi Object for 2 POTS-ports MTA with two Tel numbers separate for each port is shown in Table 19 (provided that the endpoint name is associated with the tdi instance object instead of the physical EMTA port).

Table 19 – Endpoint Representation in the tdi Object

Index	Type	Name	Admin	OperStatus	ActivityStatus
1	1	POTS1	'up'	'up'	'notActive'
2	1	POTS2	'up'	'up'	'active'

Such an approach allows the exact modeling of the PacketCable 1.5 data model. In other words, a PacketCable 1.5 device can provide flexible mapping between the endpoint names and the ports. This would allow, for example, ringing one port for different Tel numbers. An example of NdiTdiMapping object is shown in Table 20.

Table 20 – Endpoint Representation in the NdiTdiMapping Object

IfIndex	TdiList
1	POTS1
2	POTS2

PacketCable 2.0 E-DVAs

In PacketCable 2.0, each User's IMPU is assigned to the POTS port (e.g., ifTable entry). Though such representation is more flexible than the one in PacketCable 1.5 data model, it does not allow for different types of the ports. It also does not allow the delivery of different services in different groupings transparent to the telephony ports – the grouping can be only done between the IMPUs and ports.

Assuming the IMPU User1 is associated with endpoints 1, 2 (IfIndex 1,2) as shown in Table 21 and the Tdi object is configured as indicated in Table 22, then all services will be delivered to the same port-1 (tdiIndex-1). This will also allow disabling services for both Users by setting one ifIndex = 1 to "down" instead of setting both indices ifIndex=1 and 2 to "down":

Table 21 – Endpoint Representation in the NdiTdiMapping Object

IPMU	ifIndex
User1	1
User1	2

Table 22 – Endpoint Representation in the NdiTdiMapping Object

Index	Type	Name	Admin	OperStatus	ActivityStatus
1	1	POTS Line	'up'	'up'	'notActive'
2	1	POTS Line	'up'	'up'	'active'

Appendix II Acknowledgements

CableLabs wishes to thank the PacketCable Provisioning focus team participants for various contributions and efforts that led to the development of this specification. Specifically, the following individuals are thanked for their direct contributions (alphabetical by company name).

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Josh Littlefield, Cisco

Donald Joong, Ericsson

Jerry Mahler, Motorola

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